

Find the indicated derivative in each case. Simplify your answers as usual.

1.  $h'(y)$  for  $h(y) = \frac{\ln y}{1 - \ln y}$

2.  $f'(x)$  for  $f(x) = \frac{x^2 + 1}{x^3}$

3.  $f'(\Gamma)$  for  $f(\Gamma) = \frac{\beta\Gamma + \Gamma^6}{1 - \beta}$

4.  $\frac{dz}{dx}$  for  $z = (x+1)^3 e^{4x}$

5.  $f'(m)$  for  $f(m) = \frac{1}{\sec(2m)}$

6.  $x'(r)$  for  $x(r) = 3\sqrt{r} - \sqrt{\frac{3}{r}} + \sqrt{3}$

7.  $\frac{dy}{dt}$  for  $y = \ln \sqrt{5 + x^2}$

8.  $f'(x)$  for  $f(x) = \sinh(x^2 + 1)$

9.  $f'(t)$  for  $f(t) = \sin^{-1}\left(\frac{2}{t}\right)$

10.  $g'(\theta)$  for  $g(\theta) = \sqrt[3]{\tan(5\theta)}$

11.  $\frac{dy}{du}$  for  $y = 3^u + (\cot u)^3$

12.  $f'(x)$  for  $f(x) = \frac{ax^2}{(2-x)^3}$

13.  $h'(y)$  for  $h(y) = \frac{\cos y}{1 - \sin y}$

14.  $f'(t)$  for  $f(t) = \frac{t}{\sqrt{t^3 + 1}}$

15.  $g'(x)$  for  $g(x) = |x \cdot e^x|$